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COMPOSITE SEALING CAPFIELD OF THE INVENTION

The invention relates to the field of caps and, more especially, screw closure caps intended for the closure of recipients or bottles in which the glass  
5 ring comprises threading.

These bottles are typically bottles containing aperitifs, liqueurs, alcohol or alcoholic beverages, the consumption of which is typically spread out over time, thus requiring the possibility to close and open  
10 said bottles, possibly a large number of times.

These caps most frequently comprise a pilfer-proof or guarantee seal.

STATE OF THE RELATED ART

15 A large number of sealing caps with guarantee seals are already known.

Some of these caps are made of plastic, as described in the European patent No. 0107 680 in the applicant's name, and typically intended for the  
20 closure of plastic water bottles.

Others are made of metal, as described in the French patent No. 2 677 333 or in the French patent applications No. 9705182 or 9706009 in the applicant's name, and typically intended for the closure of bottles  
25 containing alcohol, aperitifs and spirits.

PROBLEM STATEMENT

Sealing caps form an important part of the packaging of liquids and make a significant  
30 contribution to the final appearance and the image of the packaged product.

The invention aims to meet an increasing demand for products enabling a differentiation, a new aesthetic feature in a field involving many constraints and, given these constraints, where the possibilities for modifications are very limited.

These constraints, other than those resulting from obvious functions for use, are firstly constraints related to the industrial manufacturing of caps at high capacities, at a cost that is not prohibitive.

Then, constraints at the packaging company processing the product to be packaged are involved. For the latter, any modification in the cap must not affect the packaging processes, equipment and standard production capacities, unless in the case of an overall reduction in production costs.

In addition to these constraints, those related to the end user, whose habits or possibilities in terms of opening recipients or bottles must always be taken into account in sealing cap design.

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#### DESCRIPTION OF THE INVENTION

The sealing cap according to the invention, intended for the screw closure of a recipient intended to contain alcoholic beverages, typically a bottle with a neck comprising threading and a pilfer-proof ring, is equipped with sealing means and pilfer-proof means, comprising two assembled parts attached in rotational and axial terms:

a) an inner part, or insert, made of plastic, comprising a so-called inner head and a so-called inner skirt, typically with a rotation axis, with said inner head comprising sealing means and said inner skirt

comprising inner threading on its inner surface intended to co-operate with the threading of said neck,

b) an outer part, or cap, enclosing and hiding at least said inner skirt, with the outer surface of said inner part and the inner surface of said outer part co-operating in view of said assembly of said inner 3 and outer parts, and is characterised in that,

1) said inner part carries out all the so-called technical functions of said cap, and comprises pilfer-proof means, with said inner skirt connected by bridges to a guarantee seal, intended to be held by the ring of said neck and separated from said skirt after a first opening of said cap,

2) said outer part carries out all or part of the decorative function of said cap, and comprises a so-called outer skirt, the length of which is such that it hides, at least before said first opening of said cap, said inner skirt and said guarantee seal, so as to be able to modify the appearance of said cap at will without having to modify said technical functions, with said guarantee seal becoming typically visible after said first opening.

These means according to the invention make it possible to solve the problem described, as illustrated with the figures described below.

#### DESCRIPTION OF FIGURES

All the figures, except figures 9a and 9b relate to cap embodiments according to the invention which comprise an inner part 3 and an outer part 4, with the references starting with a "3" typically relating to said inner part 3, and those starting with a "4" typically relating to said outer part 4.

Figures 1a to 6b are partial vertical half-sections along the axis 12 of the cap 1 screwed onto a neck 2 of a bottle.

For convenience purposes, two embodiments have been represented opposite each other in figures 1a and 1b, 2a and 2b, 3a and 3b, 5a and 5b, 6a and 6b. In these figures, the cap is sealed by an added seal 35, except in figure 3b where sealing is performed by a lip seal 36.

Figures 7 and 8 are transversal sections perpendicular to the axis 12 of the cap 1.

Figures 1a and 2a, as for figures 3a, 5a and 6a, correspond to a first guarantee seal embodiment, before a first opening in figure 1a and after a first opening in figure 2a, wherein the ends of both the inner skirt 31 and the outer skirt 41 comprise a series of bridges 33, 42 and a guarantee seal 34, 43.

The inner guarantee seal 34 comprises an inner ring 340 and flexible clips 341 that tend to deflect towards the neck.

The outer guarantee seal 43 comprises a rim 430 which passes under the lower end of the inner guarantee seal 34, such that, upon opening, the two guarantee seals 34 and 43 fall onto the neck and clearly indicate that a first opening has already taken place.

Figures 1b and 2b, as for figures 3b, 5b and 6b, correspond to a second guarantee seal embodiment, before a first opening in figure 1b and after a first opening in figure 2b, wherein only the inner skirt 31 comprises a series of bridges 33 and a guarantee seal 34. In this case, the outer skirt 41 is sufficiently long to hide the guarantee seal 34 before the first opening, but sufficiently short so that, once the

bridges 33 have been broken, the guarantee seal becomes visible (in figure 2b) and clearly indicates that a first opening has already taken place.

5 In figures 1b to 2b, said outer part 4 covers said inner part 3 entirely and is typically cylindrical in shape, the head 40 being flat, and the skirt 41 being cylindrical.

Figures 3a, 3b, 5a, 5b, 6a, 6b and 7 particularly relate to variants of said outer part 4.

10 Figure 3a: the outer part 4 forms a mushroom cap.

Figure 3b: said outer skirt 41 comprises a two-segment profile of bridged straight lines.

This outer part may be made of either moulded plastic or pressed metal and then assembled with said  
15 inner skirt 31.

Figure 5a and 5b: said outer part 4 is limited to an outer skirt 41, which covers said inner skirt 31 completely in figure 5a, and to a significant extent in figure 5b, the diameter of said inner part 3 being  
20 greater where said outer skirt 41 is absent so that said cap has a cylindrical skirt 11 of the same radius over its entire height.

Figures 6a and 6b: said inner head 30 is partially covered by said outer head 40.

25 In figure 6a, the thickness of the inner head 30 is increased where the outer head 40 is absent to obtain a uniform, plane head 10, unlike the case in figure 6b.

Figure 7: said outer skirt 41 has any non-  
30 cylindrical shape.

Figures 4a to 4e represent portions of inner 31 and outer 41 skirts and illustrate assembly embodiments of said inner 31 and outer 41 parts using circular

attachment means 44 formed by the co-operation of male circular components on one part, with female components on the other opposite part, so as to eliminate the possibility of a relative movement, in the axial direction, between said inner part 3 and said outer part 4. .

Figure 8 illustrates an assembly embodiment of said inner 31 and outer 41 parts using vertical or axial attachment means 45 formed by the co-operation of axial ribbing on the outer surface of said inner skirt 31 with axial grooves on the inner surface of said outer skirt 41, so as to bridge said inner 3 and outer 4 parts in rotation using mechanical means.

Figures 9a and 9b illustrate an assembly embodiment in which the inner skirt 31 comprises a cylindrical taper 37 on its outer surface in which a skirt 41 may be pressed.

Figures 10a and 10b illustrate another embodiment according to the invention in which said outer part 4 is itself composite and composed of an assembly of a head 400 and a skirt 410, with the possibility of using the same or different constituent materials for said head 400 and said skirt 410, increasing creation possibilities further.

Figures 11a to 11d illustrate the decorative possibilities with the localised surface treatment of an aluminium skirt, so as to obtain a contrast in colour, shine, roughness, in a word, appearance, between the hatched part 410 and the non-hatched background 411.

Figures 12a to 12f are partial axial section (figure 12a) or enlarged 12b to 12f views illustrating

radial and/or compression means embodiments intended to increase tightness;

Figure 12a illustrates two embodiments of radial compression means.

5 In the embodiment represented in the left section of figure 12a, which is enlarged in figure 12b, the compression means forms a step with  $E_a > E_r$  and the inner head is shaped like an annular rim which approximately covers the edge 22 of the neck.

10 However, in the embodiment represented in the right section of figure 12a, which is enlarged in figure 12c, the compression means forms a step with  $E_a$  similar to  $E_r$  and the inner head 30 is solid.

15 Figure 12d illustrates an example of axial compression using a circular rib 300. A circular rib or holding rim 312 enables the seal to remain attached to the cap before use.

20 Figure 12e illustrates an example of an insert applying radial compression with a curved part 311, with the insert not comprising an inner head.

Figure 12f illustrates an example of an insert applying radial compression with compression means attached to said inner head 30 and not said skirt 31.

## 25 DETAILED DESCRIPTION OF THE INVENTION

According to the invention, said outer part 4 may comprise a so-called outer skirt 41, and, if applicable, head 40.

Most of the figures illustrate this embodiment.

30 However, special decorative effects could be obtained if the skirt of the cap 1 was partly composed of a portion of said inner skirt 31 and partly of a

portion of said outer skirt 41, as would be the case in figure 5b with a shorter outer skirt 41.

Typically, said outer part 4 may comprise a straight, typically cylindrical, skirt 41, which  
5 corresponds to the most common case, but the invention can also be used to create originally shaped caps, with a non-cylindrical straight skirt 11 as represented as a section in figure 7, or a non-straight skirt, as represented in figure 3a.

10 Said outer part 4 may form a rotation surface, of a constant radius or not depending on the height in question, as illustrated in figure 3a.

In any case, said outer part 4, of any outer shape, is attached to said inner part 3; for this, said  
15 outer part 4 and said inner part 3 use mechanical 44, 45 or chemical attachment means, typically by gluing, as the means for said assembly.

Mechanical attachment means have been represented in figures 4a to 4e and 8. The inner 3 and outer 4  
20 parts may also be assembled using a snap-on or clip-on mechanism, with the materials and/or thickness of the parts 3 and 4 enabling elasticity and spring effects enabling their assembly.

In the other figures, the attachment means has not  
25 been represented, since it consists of gluing, using a layer of adhesive, or heat-sealing, of all or part of said inner part 3 on all or part of said outer part 4.

According to the invention, said inner part 3 may be a PP insert, comprising inner threading 32, on which  
30 the guarantee seal 34 comprises clips 341.

Such an insert may be obtained by PP moulding or injection. It is possible to obtain such a plastic



insert as described in the European patent No. 107 680 in the applicant's name.

According to an embodiment of the invention, said outer part 4 may be of metal, or comprise a metal part inside, and be attached to said insert 3 by gluing.

In this case, said outer part 4 may be made of surface-treated aluminium, typically brushed or anodised, to create a "metallic" colour or appearance.

According to another embodiment of the invention, said outer part 4 may be made of plastic, typically polystyrene, and attached to said insert by mechanical assembly or by gluing. Preferably, said plastic outer part 4 is metal-coated.

Whether by using surface-treated aluminium or coating plastic with metal, the invention makes it possible to obtain a wide variety of decorative effects.

The caps according to the invention may comprise any type of guarantee seal known in itself. Typically, said guarantee seal 34 comprises an inner ring 340 equipped with fastening components 341, typically clips or hooks, turned towards the inside of said cap, and snapped under said ring 20 such that, during said first opening, the bridges 33 break, with said guarantee seal 34 prevented from moving upwards by the co-operation of said components 341 with said ring 20, such that said guarantee seal 34, separated from the rest of said cap, is the visible proof of said first opening.

An example of a guarantee seal, among the many known, is given in the European patent No. 107 680.

In the cases of caps illustrated in figures 1b, 3b, 5b and 6b, the outer skirt 41 hides said guarantee seal 34, before said first opening. However, at the

first opening, during which the bridges 33 are broken, the guarantee seal, separated from the rest of the skirt, falls and is lowered by a few millimetres on the neck and becomes visible as a result, even on a closed  
5 bottle, as illustrated in figure 2b.

According to another embodiment illustrated particularly in figures 1a and 1b, said outer skirt 41, like the inner skirt 31, comprises bridges 42 attaching it to a so-called outer ring 43, with said outer ring  
10 locked upwards by said inner ring 340, typically by means of a lower rim 430 of said outer ring 43, such that, during said first opening, the outer 43 and inner 340 rings are separated from the rest of said cap.

In any case, the ring 20, by locking, during the  
15 first unscrewing, the clips 341 or any component of a guarantee seal of said inner part 3, fulfilling an equivalent function, breaks the bridges 33, and, if applicable, the bridges 42, and therefore causes the guarantee seal to fall onto the neck of the bottle,  
20 making it possible to see, unequivocally, that a first opening has already taken place.

The caps according to the invention may comprise any sealing means known in itself, typically by using either a circular lip 36 attached to said inner head,  
25 as illustrated in figure 3b, or an added seal 35 as illustrated in the other figures concerning the cap 1.

More precisely, the caps may comprise, in order to guarantee the tightness of the recipient once closed, an added seal 35 of sufficient diameter to cover the  
30 edge 22 of the neck 2 and axial and/or radial compression means on the inner surface of said insert, to apply said seal in a tight manner onto said edge 22 of said neck 2 during said closure.

A compression means is said to be axial when it is applied onto the upper part 220 of the edge, and it is said to be radial in the other cases, when it is applied either onto the curved part 221 or onto the vertical part 222 of the edge, as illustrated in figure 12d.

Said axial compression means may comprise a circular rib 300 formed on the inner wall of said inner head 30 intended to compress said seal onto the upper part 220 or said edge 22, typically plane, as illustrated in figure 12d.

Said radial compression means may comprise an annular extra thickness 310,302 formed on said inner skirt 31 or on said inner head 30, typically at the bridge 301 between the inner head 30 and the inner skirt 31, and intended to compress said seal onto all or part of the curved part 221, typically inclined, and/or onto the radial part 222, typically vertical, of the edge 22. This extra thickness may be attached to the inner skirt 31, as illustrated in figures 12a to 12e with the reference "310", or attached to the inner head 30 as illustrated in figure 12f with the reference "302".

According to a variant illustrated in figures 12a to 12d, said annular extra thickness 310 may take the form of an annular step positioned at the inner annular angle formed at the bridge of the inner head 30 and the inner skirt 31.

According to another variant illustrated in figure 12b, said inner head 30 may comprise an annular rim 38 with a punched central part, typically opposite the mouth 23 of said neck 2. This variant makes it possible

to save weight and material for the plastic insert 3, particularly in the case of radial compression means.

Indeed, the applicant has observed that, the greater the radial type of compression effort, the greater the possibility to reduce the thickness of said inner head 30.

In this case, as illustrated in figure 12e, the cap will have the following characteristics:

a) said inner head 30 has a thickness ranging from 0 to 0.5 mm,

b) said compression means is typically radial, and

c) this compression means comprises a curved part 311 with a curvature typically similar to that of the curved part 221 of said edge which is opposite.

This embodiment makes it possible to reduce the height of the cap, typically by 1 to 2 mm, which may be very useful in practice, given the standardisation constraints in the field of packaging.

The specialist may adapt the shape and exact dimensions of the insert and the axial and/or radial compression means, e.g. the thickness  $E_a$  and  $E_r$  as illustrated in figure 12b. Indeed, he may choose the thickness of said compression means as a function of the thickness  $E_j$  of the seal and the space  $E_o$  between said neck and said cap in particular, such that said recipient is closed in a tight manner by said cap, the thickness of the locally compressed seal or the distance  $E$  between the end of said compression means and said edge being typically between  $0.2 E_j$  and  $0.7 E_j$ , where  $E_j$  is typically between 1 and 2.5 mm.

Said axial and/or radial compression may be an integral part of said insert 3 or form an added part.

Preferably, said compression means is an integral part of said insert, as illustrated in figures 12a to 12f.

It is advantageous for the cap according to the invention to comprise holding means for said added seal, typically a holding rim 312 attached to said inner skirt 31.

#### EXAMPLES OF APPLICATIONS

10 Firstly, we manufactured inner parts or inserts 3 in PP with a cylindrical outer surface, with a guarantee seal 34, according to the process described in the European patent No. 107 680, and according to a common model for the figures attached, such as figures 15 1a to 2b.

Secondly, we manufactured different outer parts or caps 4:

- in aluminium as represented in figures 1a to 2b, with different surface treatments, as illustrated in 20 figures 11a to 11d,
- in metal-coated polystyrene, as represented in figures 1a to 2b.

Finally, we assembled the caps 4 and the inserts 3 using an adhesive.

25 We also manufactured caps according to figures 12b and 12e using a commercially available seal 35.

#### ADVANTAGES OF THE INVENTION

30 The invention makes it possible to solve the problem described and paves the way for a wide diversity in terms of appearance. However, these caps offer the same usage behaviour in response to the constraints encountered.

Therefore, the invention enables individualisation and customisation of caps acceptable in economic terms, using the concept according to the invention separating technical functions and aesthetic functions.

## LIST OF REFERENCES

	SEALING CAP .....	1
	HEAD .....	10
5	SKIRT .....	11
	ROTATION AXIS .....	12
	NECK OF RECIPIENT .....	2
	PILFER-PROOF RING .....	20
	THREADING .....	21
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	UPPER PART .....	220
	CURVED PART .....	221
	VERTICAL PART .....	222
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